

**REMARKS**

This communication is in response to the Office Action of March 13, 2008. A petition and the appropriate fee for a one-month extension of time are included with this amendment.

Claims 1-32 are pending in this application. Claims 1, 10, 16, 27, and 30 have been amended to more specifically point out and distinctly claim the subject matter of the invention.

Specifically, Claim 1 has been amended to include the limitation that the selector is configured to “switch back and forth between the VBR controller and the CBR controller.” Similarly, Claim 30 has been amended to include the limitation of “switching back and forth between the constant bit rate encoder and the variable bit rate encoder”. Claims 10 and 16 have been amended to include the limitation of “each macroblock type having distinct rate-quantization properties”. Claim 27 has been amended to include the limitation that the adjusting is performed “according to a time constant set to be larger than a scene”. Dependent Claim 28 has been amended accordingly. Support for the amendments is found throughout the specification, and in particular, at paragraphs [0023], [0025], [0028], [0029], [0031], [0040], [0060], [0063], and [0068]. No new matter has been added.

Claims 27-29 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Ribas-Corbera, U.S. Patent No. 6,535,251 (“Ribas-Corbera”). Applicants traverse the rejections. Reconsideration of these claims is respectfully requested.

Applicants respectfully submit that Ribas-Corbera does not disclose “adjusting said average bit rate of said variable bit rate controller to track said changes in long-term average bit rate by feedback control based on a difference between said average bit rate and an actual bit rate and according to a time constant set to be larger than a scene”. As described in the Specification, changes in the long-term average bit rate are tracked to “minimize the effect of short-term bit rate production on quality” in order to provide “the best possible quality for a predetermined file size”. (Specification, paragraph [0068]). This is accomplished by, in part, “setting the time-constant,  $\tau$ , to a large value to minimize the effect of short-term bit rate production on quality such that  $\tau$  is preferably longer than the longest expected scene of any given complexity”. (Specification, paragraph [0068]).

This time constant, as further described in the Specification, “determines the nature of the response” in a proportional integral control technique. (Specification, paragraph [0067]). That is, the time constant determines when to adjust the long-term average bit rate.

Applicants can find no disclosure of such a time constant in Ribas-Corbera. As shown and described in Ribas-Corbera with reference to FIG. 6, the updating that takes place in step 180 is performed on a GOP basis without any regards to whether a scene has occurred. In contrast, the updating performed in the present invention depends on the length of the “longest expected scene of any given complexity” in order to “minimize the effect of short-term bit rate production on quality” and provide the “the best possible quality for a predetermined file size”. (Specification, paragraph [0068]).

Therefore, Applicants respectfully submit that Ribas-Corbera does not anticipate Claim 27, as well as Claims 28-29, which respectfully depend there from. Since Ribas-Corbera fails to anticipate the claimed invention of Claims 27, Applicants respectfully submit that Claim 27 and its respective dependent claims, distinguish from, and are allowable over, the cited reference.

Claims 1-6 and 30-32 have been rejected under 35 U.S.C. § 103(a) as being unpatentable by Ribas-Corbera, U.S. Patent No. 6,535,251 (“Ribas-Corbera”), in view of Hanamura et al., U.S. Patent No. 6,654,421 (“Hanamura”). Applicants traverse the rejections. Reconsideration of these claims is respectfully requested.

Applicants respectfully submit that the combination of Ribas-Corbera and Hanamura does not disclose switching back and forth between a CBR controller and a VBR controller that are operating in tandem and independently from each other.

The Examiner’s rationale for the 35 U.S.C. § 103(a) rejection is that “it would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teaching of Hanamura’s separate VBR/CBR coders into the Ribas-Corbera rate controller in order to allow for coding flexibility on constrained bitstreams.”

The Examiner, however, has not provided any evidence that the claimed limitation of switching “back and forth between” a CBR and a VBR controller is taught, suggested, or disclosed in the cited references, either alone or in combination. As described in the Specification, “[T]he mode of operation (CBR or VBR) of programmable rate controller 260 will

depend upon parameter constraints input to programmable rate controller 260 and a logical condition selected for the arbitration logic to choose either CBR or VBR. This permits, for example, the mode of operation to be selected to be entirely CBR, entirely VBR, or *to switch back and forth between CBR and VBR* depending upon the complexity of the picture frames that are being encoded and other parameters that are selected. As a result, programmable rate controller 260 has a response that may be adapted for different encoding applications by selecting the value of parameter constraints". (Specification, paragraph [0025], emphasis added).

Nowhere in the cited references, alone, or in combination, it is disclosed, taught, or suggested that a rate controller switches back and forth between a CBR and a VBR rate controller that are operating in tandem and independently from each other. In particular, there is no disclosure, suggestion, or teaching in Hanamura of a rate controller incorporating both a CBR and a VBR rate controller and switching back and forth between them "depending upon the complexity of the picture frames that are being encoded and other parameters that are selected". (Specification, paragraph [0025]).

As described in Hanamura, the invention therein includes a "method of transcoding a coded multiplexed sound and moving picture sequence" (Hanamura, col. 19, lines 20-21) and in particular, "a method of transcoding a coded multiplexed sound and moving picture sequence, which sets the time stamp (PCR) contained in output MPEG-2 transport streams to a value in a certain range, for instance, to the initial value of the input MPEG-2 transport streams, so that the output MPEG-2 transport streams do not cause the breakdown of a MPEG-2 decoder buffer when the output MPEG-2 transport streams are inputted to the MPEG-2 decoder". (Hanamura, col. 18, lines 5-12).

The transcoding method is based on a VBR rate control method rather than on a CBR rate control method. As described in Hanamura, "[T]he video bit streams contained in the MPEG-2 transport streams are assumed to be in the variable bit rate (VBR) format. On the other hand, *a CBR rate control method* used by a conventional video bit stream transcoder, for controlling output bit rate of video bit streams in the constant bit rate (CBR) format on the basis of input bit rate as a parameter, or on the basis of the number of bits and pictures to be encoded in GOP, and the picture types *is not applicable to video streams in the VBR format*". (Hanamura, col. 14,

lines 26-34, emphasis added). That is, Hanamura acknowledges that a CBR method is not used therein because it is not applicable to MPEG-2 video streams in the VBR format. Hanamura therefore teaches away from using a CBR controller and from switching back and forth between a CBR and a VBR rate controller that are operating in tandem and independently of each other. No disclosure, suggestion, or teaching of switching back and forth between a CBR and a VBR rate controller that are operating in tandem and independently of each other is provided in Hanamura because Hanamura is limited to video streams that are solely in the VBR format.

Contrary to the Examiner's suggestion on Page 5 of the Office Action, it would not have been obvious to one of ordinary skill in the art to "incorporate teaching of Hanamura's separate VBR/CBR coders into the Ribas-Corbera rate controller in order to allow for coding flexibility on constrained bitstreams". As discussed above, Hanamura does not teach switching back and forth between a CBR and a VBR rate controller operating in tandem and independently of each other. Rather, Hanamura simply acknowledges the existence of CBR rate controllers and teaches away from applying a CBR rate controller to video streams in the VBR format. No such use of a CBR and a VBR controller is disclosed, suggested, or taught in Hanamura, nor in Ribas-Corbera, either alone, or in combination.

The Examiner further suggested that "even without the secondary Hanamura teaching, the feature of having the VBR and CBR coders operating in tandem but independently of each other as in the claims represents nothing more than separating that which was once integral, a modification which the courts have long established as unpatentable and well within the purview of one of ordinary skill in the art, *Nerwin v. Erlichman*, 168 USPQ 177, 179 (PTO Bd. of Int. 1969).

Applicants respectfully submit that the Examiner is incorrect in his characterization of VBR and CBR coders. The VBR and CBR rate controllers of the present invention, as claimed in Claims 1 and 30, operate in tandem and independently from each other. Nowhere in the Specification it is suggested that the VBR and CBR rate controllers were once an integral rate controller. The VBR and CBR rate controllers of the present invention are *separate* rate controllers with their own inputs and outputs. Hanamura itself recognizes that that a CBR is a separate controller than a VBR. The Examiner has not provided any evidence of a rate controller that switches back and forth between a CBR and a VBR rate controller that are operating in

tandem and independently of each other. The lack of disclosure, teaching, or suggestion for providing such a rate controller is a strong indication that doing so was not obvious at the time the invention was made.

In short, the combination of Ribas-Corbera and Hanamura fails to teach or suggest all of the elements of independent Claims 1 and 30. Applicants therefore respectfully submit that Claims 1 and 30 and their respective dependent claims, distinguish from, and are allowable over, the cited references.

Claims 10-26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable by Ribas-Corbera, U.S. Patent No. 6,535,251 (“Ribas-Corbera”), in view of Tan et al., U.S. Patent No. 6,542,549 (“Tan”). Applicants traverse the rejections. Reconsideration of these claims is respectfully requested.

Applicants respectfully submit that the combination of Ribas-Corbera and Tan does not disclose classifying macroblocks by type such that each macroblock type has “distinct rate-quantization properties”.

The Examiner’s rationale for the 35 U.S.C. § 103(a) rejection is that “it would have obvious [*sic*] to incorporate the Tan macroblock operative picture analysis module into the Ribas-Corbera rate controller in order ensure that Ribas-Corbera video coder adheres to VBV model constraints”. (Office Action, page 9).

The Examiner, however, has not provided any evidence that the claimed limitation of classifying macroblocks by type such that each type has distinct rate-quantization properties is taught, suggested, or disclosed in the cited references, either alone or in combination. As described in the Specification, “[F]or each input picture, picture analysis module 310 classifies the macroblocks by macroblock types having distinct rate-quantization properties. The macroblock types are classified to generate statistics regarding the frequency of macroblocks that have different rate-quantization properties. The set of possible macroblock types is specified by the set K of different macroblocks (where K has at least two members) and is based on the macroblock coding decisions, assumed here to have been made prior to the start of rate control by macroblock coding decisions module 220. Examples of macroblock types in set K may include: intra blocks in an I-picture; intra blocks in a P- or B-picture; non-intra blocks in a P-

picture without bi-directional motion; non-Intra blocks in a B-picture without bi-directional motion; and non-intra blocks in a B-Picture with bi-directional motion". (Specification, paragraph [0031]).

The macroblock classification disclosed in Tan (and the frame classification disclosed in Ribas-Corbera) simply distinguishes between I, P, and B types, without any regards to the "distinct rate-quantization properties" that may occur in different macroblocks, e.g., P and B macroblocks. For example, a P- or a B- picture may include both intra and non-intra macroblocks with distinct rate-quantization properties. Neither Tan nor Ribas-Corbera makes this distinction. Tan groups all macroblocks in a P picture in one type (P-type macroblocks) and all macroblocks in a B picture in another type (B-type macroblocks). The same grouping with respect to frames is adopted by Ribas-Corbera.

Nowhere in the cited references, alone, or in combination, it is disclosed, taught, or suggested that a further macroblock classification, i.e., one that goes beyond I, P, and B macroblocks, to consider the "distinct rate-distortion properties" of each macroblock type is used in bit allocation. The lack of disclosure, teaching, or suggestion for providing such a macroblock type classification is a strong indication that doing so was not obvious at the time the invention was made.

In short, the combination of Ribas-Corbera and Tan fails to teach or suggest all of the elements of independent Claims 10 and 16. Applicants therefore respectfully submit that Claims 10 and 16 and their respective dependent claims, distinguish from, and are allowable over, the cited references.

In view of the foregoing amendments, Applicants believe that all rejections are rendered moot, and respectfully submit that the subject application is in condition for allowance. The Examiner is invited to contact the undersigned if there are any residual issues that can be resolved through a telephone call.


The Commissioner is hereby authorized to charge any appropriate fees to Deposit Account No. 50-1283.

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